

ON THE SPECIES OF THE GENUS ANOSTOMUS.

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THE characteristics of the various fishes credited to it are such as to divide the genus *Anostomus* into three comparatively distinct groups or subgenera. The large series collected by the Thayer Expedition for the Museum of Comparative Zoölogy illustrate this to advantage, and at the same time they furnish several types that do not appear to have previously been noticed by ichthyologists. The first of the groups (*Anostomus*) is characterized by an elongate narrow snout, of which a cross section in front of the eyes would be nearly round, by a mouth turned almost directly upward and by long, slender, crenulate mandibular teeth. It contains but two of the species. The second group, to which the name *Schizodontopsis* is given, is marked by a short broad snout, of which a transverse section behind the nostrils would be sub-elliptical; by a mouth turned obliquely upward and forward, and by teeth on the mandible that are broad and truncate, having entire or chisel-shaped edges. Four species of close affinities are to be included in this group. The third of the subgenera (*Schizodon*) is similar to the second in shape of snout, but the mouth is directed forward or, in one species, obliquely downward, and the mandibular teeth are short, broad, and crenulated. This section includes the six remaining species. The characters assigned *Schizodon sag-*

ittarius will not permit its admission. Apparently it is the young of *Rhytiodon argenteo-fuscus*. The fourth tooth on each side in that species is very small and from its position against the third is not readily discovered. The teeth of the species of *Rhytiodon* differ considerably, and Kner's figures of those of *R. microlepis* do not well represent those of *R. argenteo-fuscus*, which latter agree somewhat well with those of *S. sagittarius* as described. Aside from the six teeth on the mandible there is nothing in the description that will separate *sagittarius* and *argenteo-fuscus*. The differences between *Rhytiodon* and *Anostomus* seem too great to allow of bringing them together as subgenera.

In the following table are indicated the different divisions of the genus *Anostomus* with their contents.

- Snout elongate, narrow, sub-circular in cross section ;
mouth directed upward, lower teeth long, narrow,
crenulate . . . (ANOSTOMUS).
series of scales 4 from L.l. to D. ;
flank with two longitudinal bands . . . *salmoneus*.
series of scales 6 from L.l. to D. ;
flank with two or more spots . . . *trimaculatus*.
- Snout broad, sub-elliptic in cross section ;
mouth directed obliquely upward and forward,
lower jaw longer ;
lower teeth broad, truncate or chisel-shaped
(SCHIZODONTOPSIS).
series of scales 5 from L.l. to D. ;
a band along the flank . . . *tæniatus*.
series of scales 6 from L.l. to D. ;
a band along the flank ;
transverse bands none . . . *proximus*.
transverse bands four . . . *varius*.
series of scales 7 from L.l. to D. ;
a band along the flank . . . *orinocensis*.

- 3. mouth directed forward, lower jaw little if any longer ;
lower teeth short, broad, crenulate (SCHIZODON).
series of scales 4 from L.l. to D. ;
transversely banded with brown ;
bands 3, a caudal band . . . *vittatus*.
bands 4, a caudal spot . . . *fasciatus*.
bands blotch-like, no caudal spot
dissimilis.
series of scales 6 from L.l. to D. ;
transverse bands absent ;
rows of scales 5 between L.l. and V.
isognathus.
rows of scales 4 between L.l. and V.
platæ.
mouth directed obliquely downward and forward,
lower jaw shorter ;
series of scales 5 from L.l. to D. . . *nasutus*.

(*Anostomus*.)

ANOSTOMUS SALMONEUS Gron.

Without a specimen of this species at hand it is not possible to give the characters of the teeth, these having been unnoticed by previous writers. If they agree with those of the following species, as may be expected, the crenulation will be added to the distinguishing characteristics in the diagnosis of the subgenus.

ANOSTOMUS TRIMACULATUS Kn. ; Gth.

Mouth directed upward ; snout elongate, nearly round in transverse section in front of the eyes, about twice the length of the eye ; teeth crenulate in both jaws. The formula as taken from a specimen from Gurupa is D. 12

(13), A. 11, L.l. 45, L. tr. $\frac{6}{5(7)}$. Between the lateral line and the first ray of the dorsal there are six series, and between the line and that of the ventral but five entire series, or seven between the line and the median row of the belly. The depth of the body is three and three-fourths, and the length of the head four and one-fourth times in the total length, excluding the caudal. In the length of the head the diameter of the eye is contained four and one-half times. The fifth, or the sixth, ray of the dorsal is over the middle of the length of the body. A spot is present on the flank below the dorsal, another is seen at the base of the caudal, and there are faint indications of narrow transverse bands on the back, from the occiput to the end of the dorsal fin. Opercle unspotted.

(*Schizodontopsis.*)

ANOSTOMUS TÆNIATUS Ku. ; Gth.

In all the species of this group the mouth opens obliquely upward and forward, the snout is broad in front of the eyes, and the teeth of the lower jaws are truncate or nearly entire on their cutting edges. On this species there are five series of scales between the lateral line and the dorsal, and four from the line to the ventral or five to the median series of the belly. One specimen, from Lake Hyanuary, has but four series between the line and the ventrals; in other respects it is normal and agrees with its fellows of the same locality. There are eight rays of the dorsal in front of the middle of the body. Depth of body and length of head are equal and each is contained four and three-fourths times in the length of the body.

Numerous examples from Cudajas, Iça, Jutahy, Lago Alexo, Lake Hyanuary, and Lake Saraca.

ANOSTOMUS PROXIMUS sp. n.

D. 12-13; A. 10-11; V. 9; L.l. 45; L. tr. $\frac{6}{5(6)}$.

Rather more stout than the preceding, but similar in general outline and markings. Mouth opening obliquely upward and forward, lower jaw longer, lower teeth truncate, upper crenulate. Snout about one and one-fifth times as long as the eye. Length of head and depth of body nearly equal, about two-ninths of the total length, without the caudal. The eighth ray of the dorsal is close upon the middle of the length. The row of scales from the first ray of the ventral toward the dorsal strikes the hindmost ray of the latter.

Brownish, rather dark, with a band of darker from snout to tail below the lateral line.

Closely allied to *A. tenuatus* from which it may be distinguished by the smaller, more numerous scales.

Hab. Villa Bella and Ueranduba.

ANOSTOMUS VARIUS sp. n.

D. 12-13; A. 11-12; L.l. 45-48; L. tr. $\frac{6}{5(6)}$.

Depth of body, or length of head, contained four and one-third times in the length, without caudal. Much stouter than *A. tenuatus* of the same length. Mouth opening obliquely upward and forward, eight teeth in each jaw, upper crenulate, lower truncate. Back brownish, centers of scales lighter and silvery, belly silvery. A brownish band from snout to tail, below the lateral line, ending in a black spot. The band is rather indistinct, and often obsolete. On the flank there is a transverse band of brownish behind the base of the pectoral, a second from base of dorsal to that of ventral, a third behind the dorsal, and a fourth in front of the soft dorsal. The color is us-

ually darker at the points of intersection of the longitudinal and the transverse bands. The latter are frequently indistinct, even on very young specimens. On large ones the depth is less than four and the head rather more than four and a half times in the total length, and the markings are greatly faded; some have the longitudinal bands more distinct, others the transverse, and on a few all of the bands, including the caudal spot, are obsolete. Eight or nine of the dorsal rays are in front of the middle of the length. The peculiar coloration, squamation, and stouter form serve to distinguish this fish from either of the two preceding species of this subgenus.

Hab. Gurupa, José Fernandez, Lake Hyanuary, Manaus, Obydos, Porto do Moz, Rio Negro.

ANOSTOMUS NITENS.

A. varius, var. n.

This name is given to a dozen light colored specimens from Iça. The transverse bands of the flank are reduced to blotches on the lateral line, the longitudinal line is faint or absent, and the general appearance is greyish rather than brown. The back is crossed by numerous narrow streaks, twenty-eight on one specimen, separated by lighter spaces of equal width. The lateral series of blotches is present on eight of the lot, while on the other four they are obsolete, excepting the caudal spot which is much faded. The eye is large, equal to three-elevenths of the length of the head, or to the length of the snout. Nine rays of the dorsal appear in front of the middle of the length.

ANOSTOMUS ORINOCENSIS St.

In the description of this fish it is said there are seven scales between the lateral line and the dorsal, and three and a half between the line and the ventral; the latter

statement is probably a mistake, since in the figure given there are six. The species is nearer to *proximus* and *varius* than to *teniatus*.

(*Schizodon*.)

ANOSTOMUS VITTATUS C.V. ; Gth.

D. 12; A. 11; L.l. 44; L. tr. $\frac{4}{4^{(5)}}$.

This species is closely allied to *A. fasciatus*. It is a trifle less slender. The general appearance is darker; of the bands across the flank the three anterior occupy the same positions, but the fourth has given place to a longitudinal band extending back to include the caudal spot. The snout is one and a half times the diameter of the eye. In the length of the body, without the caudal, the depth is contained three and four-fifths times, or the length of the head four and two-thirds times. The middle of the length is below the ninth dorsal ray. The mouth opens forward. The jaws are equal, and the teeth are crenulate in both.

Hab. Porto do Moz; Goyaz.

ANOSTOMUS FASCIATUS Sp. and Ag. ; Gth.

This species is very close to the preceding. Aside from being more slender, the main dependence in distinguishing it is to be placed on the coloration, as the formula is about the same for each. The tenth ray of the dorsal is nearly over the middle of the length, in which the depth is contained four and one-third and the length of the head four and two-thirds times. The mouth opens forward, the jaws are nearly equal, and the teeth are crenulate in upper and lower. The snout is about one and one-fourth times the diameter of the eye. Collected at Coary, Dutch Guiana, Hyavary, Iça, José Fernandez, Jutahy, Lago Alexo,

Lake Hyanuary, Lake Saraca, Manacapouru, Manaos, Obydos, Rio Puty, San Paolo, Serpa, Tabatinga, Teffé, Tonantins, Villa Bella.

ANOSTOMUS DISSIMILIS, sp. n.

D. 12; A. 11; V. 9; L.l. 43-45; L. tr. $\frac{4}{4(5)}$.

Nearly related to both of the preceding. Darker in color than *A. fasciatus*, and distinguished from it, as from *A. vittatus*, by the absence of a spot on the base of the tail. The blotches on the flanks vary greatly, being reduced, irregular, faint, or entirely absent. Length of head equal to the depth of body and contained in total length, without caudal, four and two-thirds times. The mouth opens forward, the lower jaw is very little the longer, the teeth are all crenulated. Twelve specimens from the Rio Puty.

ANOSTOMUS ISOGNATHUS Kn. ; Gth.

A. Knerii St.

The lateral band, figured by Kner, appears to be quite variable. Specimens from the Velhas show it still further reduced than in the form figured as *A. Knerii*, it being simply a black spot at the base of the caudal with faint indications of continuation forward and backward. There are five entire series between the lateral line and the ventral, or seven between the line and the median ventral series. Mouth directed forward, jaws nearly equal, teeth crenulate in the upper and lower. Snout about one and one-half times as long as the eye. Depth three and two-thirds and length of head four and one-fourth times in the total length, without caudal. The row of scales from the first ray of the ventral toward the hinder part of the dorsal passes entirely behind the latter.

ANOSTOMUS PLATÆ, sp. n.

D. 12; A. 11; V. 9; L.l. 45; L. tr. $\frac{6}{4(5)}$.

Mouth opening forward, lower jaw a little longer, teeth crenulate in both jaws. Length of snout equal to that of the eye. Depth of body three and one-half, or length of head four and two-thirds times in the total length, without the caudal. The ninth ray of the dorsal fin is over the middle of the length. The row of scales from the first ray of the ventral toward the hinder part of the dorsal leads to the third ray from the end of the latter. There are six rows of scales between the lateral line and the dorsal and four between the line and the first ray of the ventral or five from the line to the median ventral series. This species is stouter in front of the dorsal and more decurved about the occiput than *A. isognathus*; it has larger scales and a smaller number of rows on the ventral region.

Color silvery, back darker, with lighter streak on the middle of each scale; a faint spot at base of caudal.

Hab. Rosario, La Plata.

ANOSTOMUS NASUTUS Kn.; Gth.

Mouth opening obliquely downward and forward, lower jaw shorter, teeth crenulate in upper and lower. Six series of scales between the lateral line and the dorsal, five between the line and the ventral, and seven between the line and the median row of the belly. From the darker lateral edges of the scales, the body has the appearance of being longitudinally streaked with dark. The caudal spot fades out gradually forward as in *A. isognathus*. Fifteen specimens from the Rio Puty.